

# Learning by Doing: New Pedagogical Practices Using An Environment for Distance Education

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**Abstract.** The goal of this paper is to describe the implementation of the Multiplier Formation Program (*MFP*) *Learning-Doing: New Pedagogical Practices using an Environment of Distance Education via the Web*. The *MFP* has been offered since first semester/2005 for K12 Teachers from many Brazilian states and are the main users of the *EduKBr Portal*. These teachers are being formed as the multipliers for the *AulaNet*, a collaborative and learning environment that has been developed at the Laboratory of Software Engineering in PUC-Rio since 1997. The success reached by this experiment has been confirmed by the change of attitude of the participants in relation to ICT (Information and Communication Technologies) as the pedagogical dynamic adopted, which through some group activities stimulates the “Make-Learning” of learners. Another important result of the experiment is the elaboration of the *MFP*’s English version that will be offered in first semester/2006 for K12 Teachers who participate in the Kidlink Institute/Research Division, which is a non-commercial educational and knowledge network used by children and youths from 164 countries. The following are described in detail in the paper: the *EduKBrPortal*; the central concepts; the *AulaNet* environment; the methodology that was used for the elaboration of the *MFP* including the online evaluation process; the main results obtained and the future work.

## 1 Introduction

The *EduKbr Portal* (<http://www.edukbr.com.br>) is an educational site/environment that has been developed and implemented by the multi-disciplinary team of the KBr/Kidlink Research Group [1] in Brazil with the collaboration and partnership of the EduWeb (<http://www.eduweb.com.br>), a technology company for educational business. In period 1999-2001 the Portal’s team has made several attempts to implement a customized interface of the *AulaNet* [3] environment within *Oficina de Aprendizagem*, one of the sites of the *EduKbr Portal* [2]. *AulaNet* is a Learning Management System that is also a Web-based learning environment developed at the Laboratory of Software Engineering in PUC-Rio.

However, it was observed that most members of the Portal’s team were not identifying themselves with the *AulaNet*’s interface, and they found it difficult to use.

To provoke an attitude change in the 13 members of the KBr/Kidlink Research Group (7 teachers/researchers and 6 researchers) in relation to this environment, a distance education course via the Web named ITAE (Information Technologies Applied to the Education)-Kidlink was conducted with the team during September-December, 2004.

The time spent to realize the course (three months) was sufficient to demystify the use of the *AulaNet* by the Portal's team, as the dynamic adopted truly provoked a change in the users' posture [4] [5].

The success reached by this experiment made it possible to build a Multiplier Formation Program (*MFP*), ***Learning-Doing: New Pedagogical Practices using an Environment of Distance Education via the Web***, for the *AulaNet*'s multipliers, which has been offered since first semester/2005 for K12 Teachers from many Brazilian states who are the main users of the *EduKbr Portal*. The methodology adopted for the *MFP* construction was based on the same used in the ITAE-Kidlink prototype course.

Another important result of the experiment was the elaboration of the *MFP* English version that will be offered in first semester/2006 for K12 Teachers who participate in the Kidlink Institute/Research Division, which is a non-commercial educational and knowledge network used by children and youths from 164 countries. In this paper, the following are described in detail: some central concepts, the *EduKbr Portal*; the *AulaNet* environment; the methodology that was used for the elaboration of the *MFP*; the *MFP* evaluation process; the main results obtained until now and future work.

## 1.1 The Central Concepts

In this item we describe some relevant academic literature associated with: the *EduKbr Portal*; groupware and *CSCW* – *Computer Supported Cooperative Work*; performance evaluation in online environments and the *AulaNet* environment.

### 1.1.1 The EduKbr Portal

The *EduKbr Portal* (<http://www.edukbr.com.br>) has been structured in thematic sites and the target audiences are schools, including educators, students, parents and the general community. The Portal was structured to support about 24 websites. They inform about a number of relevant topics for Education, such as Computer Science, citizenship, research, literature and entertainment, sports and other subjects.

As of the present moment, the *EduKbr Portal* is composed of eight thematic websites: *Estúdio Web* – a large virtual repository of websites; *Celeiro de Projetos* – that presents cooperative projects; *Arte Manhas* – that proposes activities in the world of arts; *Leitura&Escrita* – that allows the construction of a dynamic community with texts, images and an infinite literary universe; *Mochila nas Costas* – that presents Geography, History and Ecology themes; *Profs Online* – that helps students to clarify their doubts; and *Colunas do Portal* – that offers recent and original articles on themes related to the training of education professionals;



Fig. 1. The EduKBr Portal interface

*Oficina de Aprendizagem* – This is a virtual classroom especially designed for teachers and students to create their own online courses using the *AulaNet*. The next websites to be implemented in the Portal in 2006 are: *Central de Comunicação*, *Kiagito*, *BubuDad@*, *Chaveiro de Idioma*, *S.O.S. Brasil*, and *Matemáticação*.

### 1.1.2 Groupware, CSCW and the evaluation of the online learning process

Groupware [6] is any computational technology that makes group work available cooperatively with digital media. Research in *CSCW* – *Computer Supported Cooperative Work* enables cooperative learning between students and teachers and among students, showing that different learning techniques using group tasks are efficient in the cognitive, emotional and social domains [7].

Research in the field of online learning is related to some evaluation mechanisms, which are based on communication and collaboration tools used during the learning process. These tools supply means to store and make available information about activities accomplished by the students so that the teacher can monitor and evaluate them [8]. These mechanisms have been already implemented in some Learning Management Systems (LMSs), such as the *AulaNet*. Specifically, the use of these tools can support three of the teacher's main tasks: individualized supervision, the delivery of curricula content and the incentive to the discussion [9].

### 1.1.3 The *AulaNet* Environment

*AulaNet* (Figure 2) is a Learning Management System based on a groupware approach for the creation, delivery and administration of Web-based courses. It was developed in June, 1997, at the Laboratory of Software Engineering at the Catholic University of Rio de Janeiro (PUC-Rio) [3]. It is freeware, and is available for download in Portuguese, English, and Spanish versions (<http://www.eduweb.com.br>).



**Fig. 2.** The AulaNet interface

The *AulaNet* is based on a groupware approach. To work in a group, people need to exchange information (i.e., to communicate), to organize themselves (to coordinate) and to act together in a shared space (to cooperate). Awareness, which is the act of acquiring information through the senses, also plays a central role in this model. These three concepts—communication, coordination and cooperation—are the main elements of the *3C* model for collaborative work [10].

The communication services of the *AulaNet* [11] allow the participants of a class to exchange messages. The *Discussion List* and *Conferences* services enable the asynchronous exchange of messages among participants. The *Contact with Teachers* service offers private and asynchronous communication between a learner and the teachers. The *Debate* service is a chat tool for synchronous communication among all the participants. The *Message to Participants* service is an instant messenger that establishes the synchronous message exchange between two participants.

The coordination services of *AulaNet* were designed for teachers. The *Lesson Plan* enables the teacher to organize the course contents. The *Exam* enables the creation of multiple-choice questions for an evaluation of the learners. The *Follow-up Reports* service presents information about learners' participation within the course activities.

The cooperation services define different spaces for the exchange of information. The *Bibliography* and *Webliography* services offer the teacher the possibility of creating references for documents. In the *Documentation* service, didactic content can be disposed dissociated from the *Lesson Plan*. Finally, the *Task* service defines an activity in which learners must generate content that will be available to the other learners.

The creation of a course within the *AulaNet* consists of the selection and configuration by the teacher of the services that are going to be used during the course, which may be done in advance or on the fly, during the course. In order to access the different services available through the course, the learner uses a menu represented by a remote control unit (Figure 2).

## 2 The Methodology of the MFP

The Multiplier Formation Program (*MFP*) *Learning-Doing: New Pedagogical Practices using an Environment of Distance Education via the Web*, has been offered since first semester/2005 for K12 Teachers from many Brazilian states. The methodology used for the elaboration of this *MFP* was based on the same used in the ITAE-Kidlink, considered a prototype course [4] [5].

Before the beginning of the *MFP*, the teachers must register based on an announcement posted on the *Portal EduKBr*. For the *MFP*'s implementation, the mediators used the following methodology: **STAGE 1:** working with the *AulaNet* services: *Discussion List*, *Lesson Plan*, *Documentation*, *Conferences* and *Contacts with Teachers*. **STAGE 2:** Learning how to categorize messages (*Conferences* service) and how to consult the *AulaNet Participation Reports*. **STAGE 3:** Using the *Tasks* service, by following these steps: after the learners have been grouped, the *MFP*'s mediators define a theme and each group has to prepare a prototype version of a PPT presentation, which has to be submitted in the *Tasks* service. Next, each learner has to collaboratively evaluate the prototype version of each group, by using the collaborative evaluation conferences (*Conferences* service), using one for the group. Finally, the groups have to prepare the final version of the PPTs, which have to be submitted again in the *Tasks* service. **STAGE 4:** the main purpose of this stage is the evaluation of the *EduKBr Portal* when the participants can evaluate each of the Portal's eight thematic sites.

There are three chats that use the *Debate* service during the *MFP*. The main goal of the last chat will be to conduct a general evaluation of the *MFP* and the *AulaNet* environment. See below the schedule/methodology of the *MFP*, which was applied in first semester/2005:

**Table 1.** The schedule/methodology used with the participants of Groups 1 and 2 in the 1st semester / 2005

DESCRIPTION
The main objective of this distance learning course via the Web is to present to K-12 teachers, the main users of the EduKBr Portal, the <i>AulaNet</i> teaching/learning environment and its pedagogical usage
COURSE PROGRAM
*How to use the <i>AulaNet</i> services " <i>Communication, Cooperation and Coordination</i> " *How to use the EduKBr Portal educational potentialities.
PRE-REQUISITES
It is desirable that learners are not only familiar with the Internet (browser, e-mail, lists etc.) and/or text editor and/or a transparency, but also have experience in teaching in any area and level. It is fundamental that learners are motivated, have enough time to dedicate themselves to the course and interact with each other.

<b>EVALUATION</b>
A qualitative and quantitative evaluation will be done describing the learners' participation that must correspond to at least 75% of the total of activities. This can be verified by observing the <i>AulaNet Participation Reports</i>
<b>METHODOLOGY / SCHEDULE</b>
<p><b>STAGE 1:</b> working with <i>Discussion List service, Lesson Plan, Documentation, Conferences</i> and <i>Contacts with Teachers</i></p> <p>15/03 - 27/03: <i>Lesson Plan and Documentation</i></p> <p>15/03 - 27/03: <i>Discussion List</i>: learners have to introduce themselves</p> <p>15/03 - 27/03: <i>Conferences</i>: taking part in the <i>Informal Talk</i> conference with the reading of a text about a change in attitude and <i>Idle Talk</i></p> <p>28/03: First online <i>Debate</i></p> <p><b>STAGE 2:</b> Learning how to categorize messages (<i>Conferences service</i>) and consult the <i>AulaNet Participation Reports</i></p> <p>28/03 - 10/04: <i>Lesson Plan</i></p> <p>28/03 - 10/04: <i>Conferences</i>: Categorizing messages (seminar and 3 questions elaborated from messages posted in <i>Informal Talk conference</i> (Class 1))</p> <p>05/04 - 10/04: Consulting some <i>AulaNet Participation Reports</i></p> <p>11/04: Second online <i>Debate</i></p> <p><b>STAGE 3:</b> Using the <i>Tasks</i> service, by following the steps:</p> <p>11/04 - 17/04: <i>Lesson Plan</i></p> <p>11/04 - 20/04: Each group has to elaborate the prototype version of a PPT presentation</p> <p>21/04 - Submission, per group, of the prototype version</p> <p>21/04 - 01/05: The collaborative evaluation of the prototype version of each group</p> <p>02/05: Third online <i>Debate</i></p> <p>02/05 - 11/05: Collaborative evaluation of the prototype version per group</p> <p>12/05 - 19/05: The final version of the PPT presentation, per group</p> <p>20/05 - Submission, per group, of the final PPT version</p> <p><b>STAGE 4:</b> Evaluating the EduKBr Portal's sites</p> <p>20/05 - 27/05: <i>Lesson Plan</i></p> <p>22/05 - 26/05: Evaluating the sites <i>Estúdioweb</i> and <i>Leitura&amp;Escrita</i></p> <p>27/05 - 01/06: Evaluating the sites <i>Arte Manhas</i> and <i>Celeiro de Projetos</i></p> <p>02/06 - 09/06: Evaluating the sites <i>Mochila nas Costas</i> and <i>Profs. Online</i></p> <p>10/06 - 12/06: Evaluating the sites <i>Oficina de Aprendizagem</i> and <i>Colunas do Portal</i></p> <p>13/06: Fourth online <i>Debate</i> (general evaluation of the course and the <i>AulaNet environment</i>)</p>

The online evaluation process of the *MFP* considers a quantitative / qualitative methodology and is described below. Table 2 shows the grades obtained by the participants of the two Groups formed in the first semester/2005. Each column, which is described below, represents the final grade obtained in each *MFP* activity:

**Table 2.** Evaluation Process of the Multiplier Formation Program – Group 4 of the 2<sup>nd</sup> semester / 2005

Participant Name	Disc. List Activity	Conferences service's activities						Tasks activity	Debate activity	AulaNet Evaluation	Final grade
		C1 Presentation	C2 Informal Talk	C3 Change Attitudes.	C4 Change Ideas	C5 Collaborative Evaluation	C6 Portal Sites' Evaluation				
		C8 Ppt.Final Version	C9 Debate	C10 Satisfaction Research..	C11						
AA	10	1.5	0.7	2.0	3.0	-	7.2	7.0	2.5	10	7.5
AELS	10	1.0	0.8	2.0	3.0	-	6.8	7.0	7.5	10	8.0
EG	5.0	2.0	1.0	2.0	3.0	-	8.0	7.5	7.5	10	8.0
LHG	10	1.5	1.0	2.0	3.0	2.0	9.5	8.0	7.5	10	9.0
MELM	10	1.0	1.0	2.0	3.0	2.0	9.0	8.0	10	10	9.0
MLC	10	2.0	1.0	2.0	3.0	2.0	10	7.0	2.5	10	8.5
MAS	10	0.5	-	2.0	3.0	-	5.5	7.5	2.5	10	7.2
NFS	5.0	1.0	-	2.0	-	-	3.0	7.5	5.0	-	4.2
NRVX	10	1.5	1.0	2.0	3.0	2.0	9.5	8.0	10	10	9.3
NSC	-	0.5	1.0	2.0	-	-	3.5	7.5	5.0	-	3.8
RDGO	10	2.0	1.0	2.0	3.0	1.2	9.2	7.5	10	10	9.0
RMENGU	10	2.0	1.0	2.0	3.0	-	8.0	8.0	5.0	10	8.3
SEE	5.0	2.0	1.0	2.0	3.0	1.2	9.2	7.0	5.0	10	8.0
VZS	5.0	0.8	-	-	-	-	0.8	7.0	-	-	2.8

*Conferences service's activities* (columns C2 to C6) – Each participant should participate in five conferences during the *MFP*. The evaluation in each conference considers the amount and the quality of the posted messages. The maximum grade that each participant can obtain in each one is listed below:

**C2 - Informal Talk Conference** (2<sup>nd</sup> table column) – each participant would obtain the maximum grade (2.0) if he has posted messages about the four texts which were available in the *Documentation* service and if he has posted messages in the *Idle Talk* option of this conference. This activity is a part of the first stage of the *MFP*.

**C3 - Change of Attitude Conference** (3<sup>rd</sup> column) – each participant would obtain the maximum grade (1.0) if he has posted messages in this conference, which has a seminar and three questions about the change of attitude of the teachers in relation to the Information and Communication Technologies (ICT). This activity is a part of the second stage of the *MFP*.

**C4 - Change of Ideas Conference** (4<sup>th</sup> column) – each participant would obtain the maximum grade (2.0) if he has posted messages in this conference. The goal of this conference is to stimulate the participants to change ideas about the collaborative work group. This activity is a part of the third stage of the *MFP*.

**C5 - Collaborative Evaluation Conference** (5<sup>th</sup> column) – each participant would obtain the maximum grade (3.0) if he has evaluated the work of the other groups. This activity is a part of the third stage of the *MFP*.

**C6 - Thematic Sites Evaluation Conference** (6<sup>th</sup> column) – each participant would obtain the maximum grade (2.0) if he has evaluated all the eight thematic sites of the EduKBr Portal (<http://www.edukbr.com.br>). This activity is related to the fourth stage of the *MFP*.

**C7 – The Conferences service's final grade** (7<sup>th</sup> column) – this column shows the sum of all grades that each participant has obtained in the activities involving the *Conferences* service. The weight of this activity in the final evaluation grade is 3.0.

**C8 – The grade of the Ppt final version presentation** (8<sup>th</sup> column) (grade from 0 to 10) – this column shows the grade that the *MFP*'s mediators has given to the final Ppt final version presentation of each work group. This activity is related to the third stage of the *MFP*. The weight of this activity in the final evaluation grade is 3.0.

**C9 - The Debate activity** (9<sup>th</sup> column) (grade from 0 to 10) – there are four chats during the *MFP*. The grade for the the participatin in each one is 2.5. The weight of the final grade of this activity in the final evaluation grade is 1.0.

**C10 - The Satisfaction Research** (grade from 0 to 10)– this column shows if each participant has sent the *MFP* and the *AulaNet* final evaluation questionnaire. There are two possibilities: the participant has sent the satisfaction research (grade 10) or hasn't sent (grade 0). The weight of this activity in the final evaluation grade is 2.0.

See below the general formula for the calculation of the final grade (FG) of each participant in the *MFP*. Table 2 shows the results of the online evaluation process of the participants of Group 4 (2<sup>nd</sup> semester).

$$FG = [(C1*1.0) + (C7*3.0) + (C8*3.0) + (C9*1.0) + (C10*2.0)] / 10$$

### 3 Results

In 2005, 44 teachers from many Brazilian states were trained as multipliers for the *AulaNet* using the *MFP*. Three teachers who were trained in the first semester/2005 acted as mediators in the second semester and they worked totally at a distance. This procedure will be used in 2006's *MFP*, as well. In the Tables below, some statistical analyses show the participation in 2005:

Table 3 presents the number and the percentage of participants who were enrolled in the 1<sup>st</sup> semester of 2005. It also shows how many of them began to participate and how many of them did not begin to participate in the *MFP*.

**Table 3.** Percentage of participants who began to participate in the *MFP* - 1<sup>st</sup> semester of 2005

Total	Number (%)
Enrolled	46 (100%)
Enrolled who began to participate	28 (60.86%)
Enrolled who didn't begin to participate	18 (39.13%)

Table 4 shows, out of the total number of participants who began to participate in the *MFP* in the first semester/2005, how many of them participated in all of the *MFP*'s activities and how many of them evaded the Training Program.

**Table 4.** Percentage of participants who participated in all *MFP*'s activities - 1<sup>st</sup> semester of 2005

Total	Number (%)
Enrolled who began to participate	28 (100%)
Enrolled who have participated in all activities	21 (75%)
Enrolled who have evaded	7 (25%)

Table 5 shows the number and the percentage of participants who were enrolled in the 2<sup>nd</sup> semester of 2005. It also shows how many of them began to participate and how many of them did not begin to participate in the *MFP*.



**Table 5.** Percentage of participants who began to participate in the *MFP* – 2<sup>nd</sup> semester of 2005

Total	Number (%)
Enrolled	63 (100%)
Enrolled who began to participate	46 (73%)
Enrolled who didn't begin to participate	17 (27%)

Table 6 shows, from the total of participants who began to participate in the *MFP* in the second semester/2005, how many of them participated in all *MFP*'s activities and how many of them evaded the Training Program.

**Table 6.** Percentage of participants who participated in all the *MFP*'s activities – 2<sup>nd</sup> semester of 2005

Total	Number (%)
Enrolled who began to participate	46 (100%)
Enrolled who have participated in all activities	23 (50%)
Enrolled who have evaded	23 (50%)

Table 4 (1<sup>st</sup> semester/2005) shows that the evasion rate was lower than in Table 6 (2<sup>nd</sup> semester/2005). This happened mainly because the following facts occurred in the 2<sup>nd</sup> semester/2005: the choosing of the teachers group; excessive teacher workload in December 2005; the difficulties of participants in downloading the Java Plug-in necessary to enable use of the *AulaNet* Debate service and equipment problems faced by the participants during the *MFP*.

## 4 Conclusions and Future Work

The most important points of the methodology adopted have been the proposed activities that stimulated the "Make-Learning" of the learners. This is being made possible through the preparation of group projects using the *AulaNet's Tasks* service, which allows great interaction among the participants and the collective construction of knowledge.

The success achieved by this experiment has been confirmed by the change of attitude of the participants of all editions of the *MFP* in relation to ICT (Information and Communication Technologies). This fact represents major innovation since teachers can work with their students using a new pedagogical tool.

An important future work is the partnership between the KBr/Kidlink Group of Research and the Literature Department of PUC-Rio. The goal of this project is to use the *MFP*'s Portuguese version to train teachers who will apply a new pedagogical tool for teaching several languages through distance education courses using the *AulaNet*.

Another important future work is the inclusion of the *MFP* in the EduKBr Portal to assist the 160 K12 teachers who are on a waiting list.

The implementation of the *MFP* English version in the first semester of 2006 for K12 Teachers from other countries of the Kidlink Institute/Research Division (<http://www.khouse.fplf.org.br/form/AulaNet/eng/AulaNet.html#>) is foreseen.

Finally, based on the results of the *MFP* it will be possible to generate and conduct new research in the field of Educational Technology using the *AulaNet* environment at the Laboratory of Software Engineering in PUC-Rio. And as a result we will improve the exchange of experiences between the Computer Science and Education areas, always representing a major challenge.

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